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CNAS L0446

GRGTEST

Page 1 of 44

# Test Report

Verified code: 926322

Report No.: E20240725192701-15

Customer: Lumi United Technology Co., Ltd

Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

Sample Name: Voice Mate H1

Sample Model: AT-R01E

Receive Sample Aug.05,2024  
Date:

Test Date: Aug.09,2024 ~ Aug.22,2024

Reference Document: AS/NZS 4268:2017

Test Result: Pass

Prepared by:

*Wen Wenwen*

Wen Wenwen

Reviewed by:

*Wu Haotong*

Wu Haotong

Approved by:

*Xiao Liang*

Xiao Liang

GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2024-09-13

GRG METROLOGY & TEST GROUP CO., LTD.

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**REPORT ISSUED HISTORY**

Report Version	Report No.	Description	Compile Date
1.0	E20240725192701-15	Original Issue	2024-09-05

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**1. TEST RESULT SUMMARY**

Test Item	Test mode	Test Requirement	Test Method	Test Result
<b>1. Transmitter Part</b>				
Maximum EIRP	Mode 1	AS/NZS 4268:2017 Clause 6.3	ETSI EN 300 328 V2.2.2/5.4.2.2.1	PASS
Power Spectral Density	Mode 1	AS/NZS 4268:2017 table 1 row 59	ANSI IEEE C63.10-2020 section 11.10	PASS
Occupied Channel Bandwidth & Operating frequency	Mode 1	AS/NZS 4268:2017 Clause 6.5 and Clause 6.6	ETSI EN 300 328 V2.2.2/5.4.7.2.1	PASS
Transmitter spurious emissions	Mode 1	AS/NZS 4268:2017 Clause 6.4	ETSI EN 300 328 V2.2.2/5.4.9.2.2	PASS
<b>2. Receiver Part</b>				
Receiver spurious emissions	Mode 2	AS/NZS 4268:2017 Clause 7.2	ETSI EN 300 328 V2.2.2/5.4.10.2.2	PASS

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## 2. GENERAL DESCRIPTION OF EUT

### 2.1 APPLICANT INFORMATION

Name: Lumi United Technology Co., Ltd  
Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

### 2.2 MANUFACTURER

Name: Lumi United Technology Co., Ltd  
Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

### 2.3 BASIC DESCRIPTION OF EUT

Product Name: Voice Mate H1  
Product Model: AT-R01E  
Trade Name: Aqara  
Additional Model: AT-R01D  
Model difference descriptions: They have the same software and hardware constructions including circuit diagram, PCB layout and electrical parts, except Model name and packaging are different, as they would distribute in different regions to satisfy subdividing market demands.  
Power Supply: 3.0V DC supplied by button cell  
Battery Specification: CR2450 3.0V DC  
Frequency Range: BLE: 2402MHz-2480MHz  
Modulation Type: Bluetooth LE with 1M & 2M: GFSK  
Antenna Type: Internal antenna  
Antenna Gain: 1.0dBi (Max.)  
Sample No: E20240725192701-0001, E20240725192701-0003  
Temperature Range: 0 °C ~ 50 °C  
Hardware Version: V1.0  
Software Version: V1.0.0.1  
Note 1: The EUT antenna gain is provided by the applicant. This report is made solely on the basis of such data and/or information. We accept no responsibility for the authenticity and completeness of the above data and information and the validity of the results and/or conclusions.

Note 2:

The EUT have two colors, the one is white, the other is black, they have the same software and hardware constructions including circuit diagram, PCB layout and electrical parts, except color is different. All tests were performed on the AT-R01E model.

## 2.4 TEST MODE

Test mode 1: BLE fixed transmitting mode

Test mode 2: BLE receiving mode

## 2.5 FREQUENCY BAND AND THE TEST FREQUENCY

Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>*00</b>	<b>2402</b>	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
<b>*19</b>	<b>2440</b>	<b>*39</b>	<b>2480</b>

\* is the test frequency

## 2.6 DESCRIPTION OF EQUIPMENT

The type of the equipment	<input type="checkbox"/> FHSS	<input checked="" type="checkbox"/> other forms of modulation	/	
Adaptive / non-adaptive equipment	<input type="checkbox"/> Non-adaptive Equipment	<input checked="" type="checkbox"/> adaptive Equipment without the possibility to switch to a non-adaptive mode	<input type="checkbox"/>	adaptive Equipment which can also operate in a non-adaptive mode
The equipment has an implemented	<input type="checkbox"/> Frame Based equipment	<input checked="" type="checkbox"/> Load Based equipment	<input type="checkbox"/> non-LBT based DAA mechanism	<input type="checkbox"/> other
Antenna Gain	<input checked="" type="checkbox"/> Antenna1 1.0dBi	<input type="checkbox"/> Antenna 2 dBi	<input type="checkbox"/> Antenna 3 dBi	<input type="checkbox"/> Antenna 4 dBi
Beamforming Gain	<input type="checkbox"/> Yes, dBi	<input checked="" type="checkbox"/> No		
Extreme operating conditions	<input checked="" type="checkbox"/> Operating temperature range:	<input checked="" type="checkbox"/> Min 0°C	<input checked="" type="checkbox"/> Max +50°C	

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### 3. LABORATORY AND ACCREDITATIONS

#### 3.1 LABORATORY

The tests and measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

Add : No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen,  
518110, People's Republic of China  
P.C. : 518110  
Tel : 0755-61180008  
Fax : 0755-61180008

#### 3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:2017.

China CNAS(L0446)

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#### 4. MEASUREMENTS UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in ETSI EN TR 100 028-1 (i.15) and ETSI EN 100 028-2(i 8):

<b>Measurement</b>		<b>Frequency</b>	<b>Uncertainty</b>
Radiated Emission	Horizontal	30MHz~200MHz	4.0dB
		200MHz~1000MHz	4.1dB
		1GHz~12.75GHz	4.9dB
	Vertical	30MHz~1000MHz	3.9dB
		200MHz~1000MHz	4.2dB
		1GHz~12.75GHz	5.0dB

<b>Measurement</b>	<b>Uncertainty</b>
RF frequency	$6.0 \times 10^{-6}$
RF power conducted	0.78dB
Occupied channel bandwidth	0.40dB
Unwanted emission, conducted	0.68dB
Humidity	6%
Temperature	2°C

Note:

- <sup>1)</sup> This uncertainty represents an expanded uncertainty expressed at approximately the 95%.  
This uncertainty represents an expanded uncertainty factor of  $k=2$ .

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## 5. EQUIPMENT AND TOOLS USED DURING TEST

### 5.1 TEST EQUIPMENT AND TOOLS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
<b>Maximum EIRP &amp; Maximum e.i.r.p. spectral density &amp; occupied channel bandwidth &amp; Operating frequency</b>				
Simultaneous sampling DAQ	TONSCEND	JS0806-2	21B8060365	2024-12-28
High and low temperature humid heat test chamber	FC	FPHC-23AW-40	FD202306015	2024-09-10
Spectrum Analyzer	R&S	FSW43	102072	2025-06-14
BT/WIFI System	TONSCEND		JS1120-3	
<b>Transmitter spurious emissions &amp; Receiver spurious emissions</b>				
Spectrum Analyzer	Keysight	N9010A	MY55370330	2024-09-08
Spectrum Analyzer	R&S	FSV3044	101184	2025-07-19
Bi-log Antenna	Schwarzbeck	VULB9163	01279	2025-02-04
Horn Antenna	Schwarzbeck	BBHA9120D	02499	2024-09-11
Amplifier	Tonscend	TAP9E6343	AP20E806065	2025-03-01
Amplifier	Tonscend	TAP01018048	AP20E8060076	2025-03-01
Amplifier	Tonscend	TAP037030	AP20E8060081	2025-03-01
Test software	Tonscend		JS36-RSE/5.0.0.1	

Note: The calibration interval of the above test instruments is 12 months.

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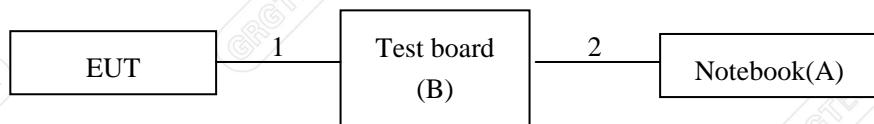
## 5.2 LOCAL SUPPORTIVE INSTRUMENTS

No.	Name of Equipment	Manufacturer	Model	Serial Number
A	Notebook	DELL	Latitude3300	2C6CFW2
B	Test board	/	/	/

No.	Cable Type	Qty.	Shielded Type	Ferrite Core(Qty.)	Length
1	Serial cable	1	No	0	0.2m
2	USB cable	1	No	0	0.5m

Note: The notebook is just used to produce fixed frequency transmitting.

## 5.3 CONFIGURATION OF SYSTEM UNDER TEST



Software version	Test level
QCOM_1.0	2402MHz: 80 2440MHz: 80 2480MHz: 80

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## 6. RADIO TECHNICAL REQUIREMENT SPECIFICATION

### 6.1 MAXIMUM EIRP

Test Requirement: AS/NZS 4268:2017 Clause 6.3

Test Method: ETSI EN 300 328 V2.2.2/5.4.2.2.1

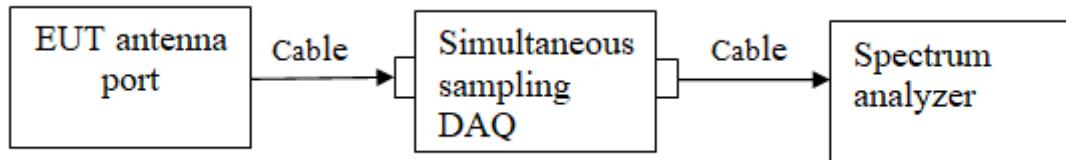
#### 6.1.1 LIMIT

For adaptive equipment, the maximum RF output power shall be 20 dBm.

The maximum RF output power for non-adaptive equipment shall be declared by the manufacturer and shall not exceed 20 dBm. See clause 5.4.1 m). For non-adaptive equipment, the maximum RF output power shall be equal to or less than the value declared by the manufacturer.

This limit shall apply for any combination of power level and intended antenna assembly.

#### 6.1.2 TEST CONFIGURATION



#### 6.1.3 TEST PROCEDURES

Test procedure: Test procedure is according to Clause 5.3.2.2.1 of ETSI EN 300 328 V2.2.2

Test channel: Lowest channel, Middle channel, Highest channel

Test condition: Normal and extreme test conditions.

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### 6.1.4 TEST RESULTS

Test environment: Normal condition: 26.2°C/50%RH/101.0kPa

Extreme test conditions: Low Temp: 0°C

High Temp: +50°C

Test Engineer: Qin tingting

Test Date: 2024-08-09

Test Voltage: DC 3V

Test Condition	Test mode	Antenna	Frequency [MHz]	EIRP[dBm]	Limit[dBm]	Verdict
NTNV	BLE_1M	Ant1	2402	9.50	20	PASS
			2440	9.42	20	PASS
			2480	9.29	20	PASS
	BLE_2M	Ant1	2402	9.50	20	PASS
			2440	9.42	20	PASS
			2480	9.29	20	PASS
LTNV	BLE_1M	Ant1	2402	9.50	20	PASS
			2440	9.42	20	PASS
			2480	9.29	20	PASS
	BLE_2M	Ant1	2402	9.50	20	PASS
			2440	9.42	20	PASS
			2480	9.30	20	PASS
HTNV	BLE_1M	Ant1	2402	9.50	20	PASS
			2440	9.42	20	PASS
			2480	9.29	20	PASS
	BLE_2M	Ant1	2402	9.50	20	PASS
			2440	9.42	20	PASS
			2480	9.29	20	PASS

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## 6.2 POWER SPECTRAL DENSITY

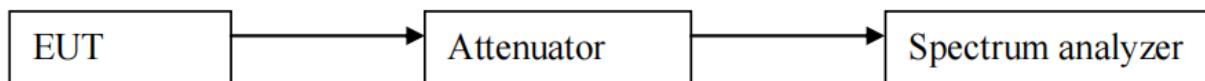
Test Requirement: AS/NZS 4268:2017 table 1 row 59

Test Method: ANSI IEEE C63.10-2020 section 11.10

### 6.2.1 LIMIT

The limit is 25mW per 3kHz.

### 6.2.2 TEST CONFIGURATION



### 6.2.3 TEST PROCEDURES

Test condition: Normal test conditions

Test channel: Lowest channel, Middle channel, Highest channel

- 1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
- 2) Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 3) Set the analyzer span to 1.5 times the DTS bandwidth. Set the RBW = 3 kHz. Set the VBW  $\geq$  3 RBW. Detector = peak. Ensure that the number of measurement points in the sweep  $\geq$  2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
- 4) Repeat above procedures until all frequencies measured were complete.

### 6.2.4 TEST RESULTS

Environment: 25.3°C/59%RH/101.0kPa

Tested By: Qin tingting

Voltage: DC 3V

Date: 2024-08-22

BLE\_1M

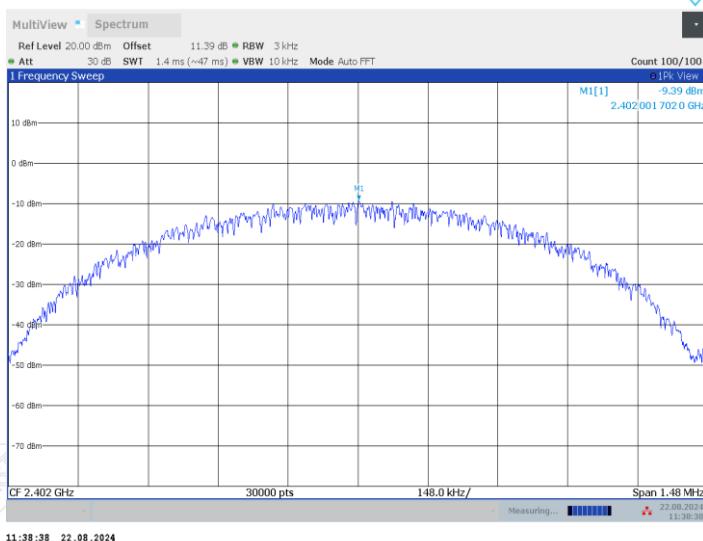
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Test Result
Lowest	2402	-9.39	8.00	PASS
Middle	2440	-9.40		PASS
Highest	2480	-9.69		PASS

## BLE\_2M

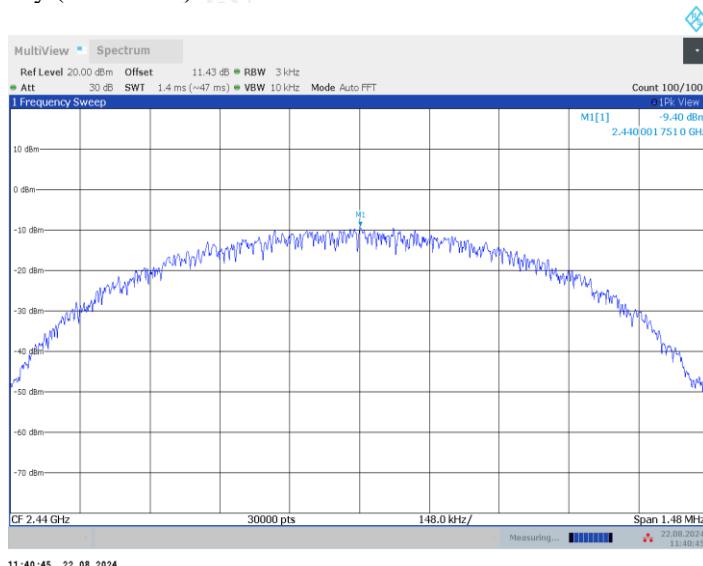
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Test Result
Lowest	2402	-10.19	8.00	PASS
Middle	2440	-10.23		PASS
Highest	2480	-10.53		PASS

## BLE\_1M

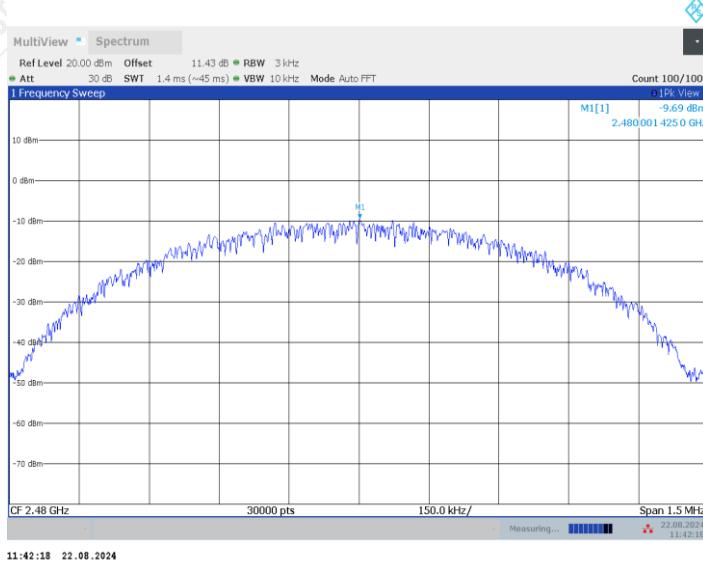
Lowest Frequency (2402MHz)



Middle Frequency (2440 MHz)

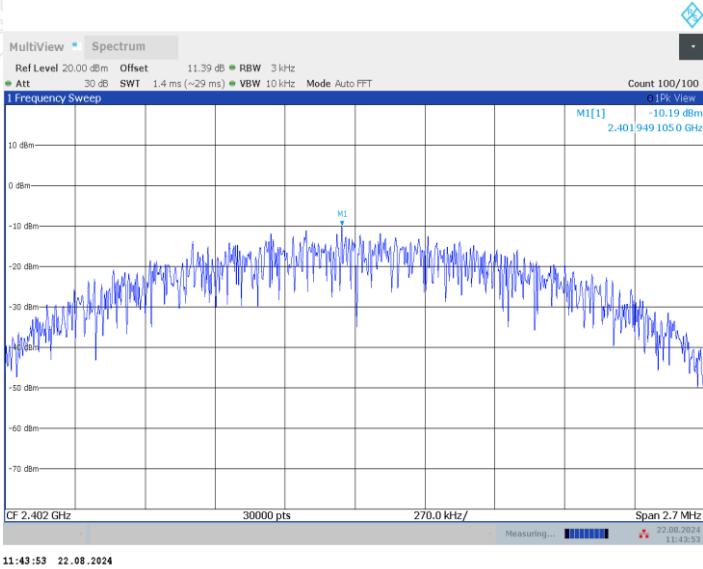


## Highest Frequency (2480MHz)

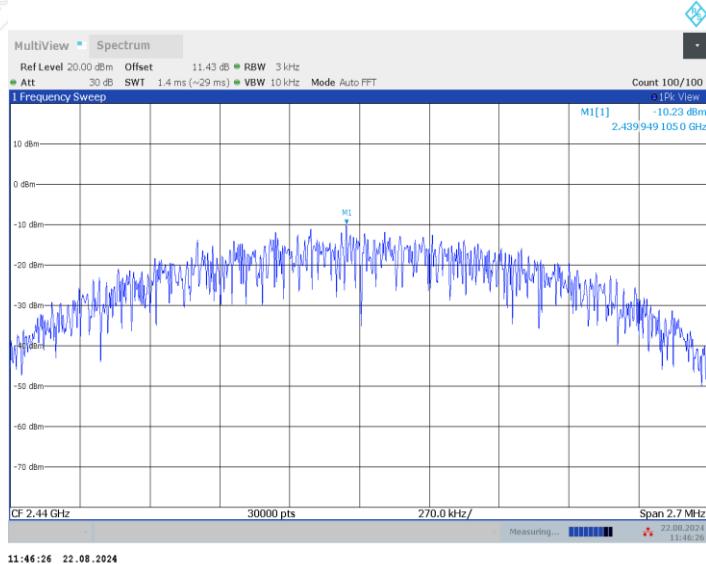


BLE\_2M

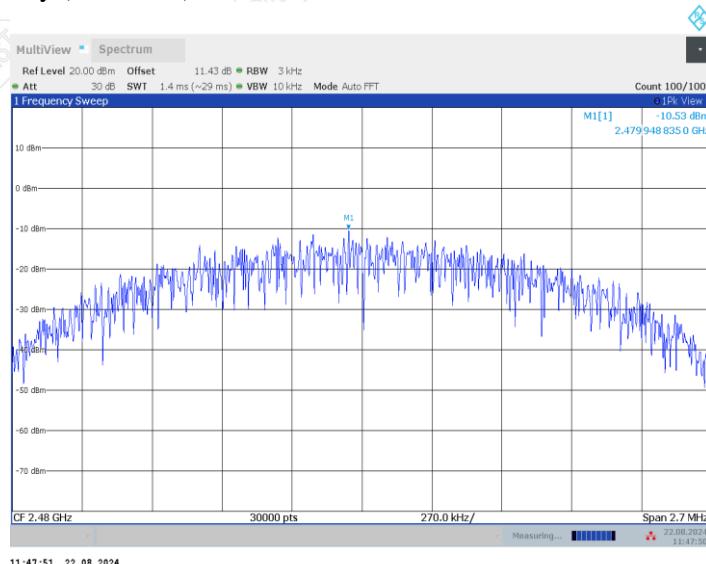
## Lowest Frequency (2402MHz)



## Middle Frequency (2440 MHz)



## Highest Frequency (2480MHz)



### 6.3 OCCUPIED CHANNEL BANDWIDTH & OPERATING FREQUENCY

Test Requirement: AS/NZS 4268:2017 Clause 6.5 and Clause 6.6

Test Method: ETSI EN 300 328 V2.2.2/5.4.7.2.1

#### 6.3.1 LIMIT

This requirement applies to all types of non-FHSS equipment.

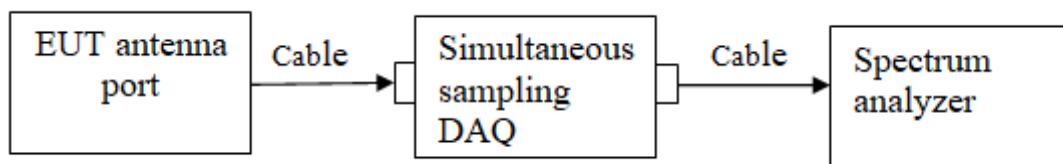
The Occupied Channel Bandwidth shall fall completely within the band given in table 2.

In addition, for non-adaptive equipment using wide band modulations other than FHSS and with e.i.r.p. greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

Table 2: Service frequency bands

	<b>Service frequency bands</b>
Transmit	2 400 MHz to 2 483,5 MHz
Receive	2 400 MHz to 2 483,5 MHz

#### 6.3.2 TEST CONFIGURATION



#### 6.3.3 TEST PROCEDURES

Test condition: Normal test conditions.

Test channel: Lowest channel, Middle channel, Highest channel

Test procedure: Test procedure is according to Clause 5.4.7.2.1 of ETSI EN 300 328 V2.2.2

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### 6.3.4 TEST RESULTS

Test environment: Normal condition:  
26.2°C/50%RH/101.0kPa

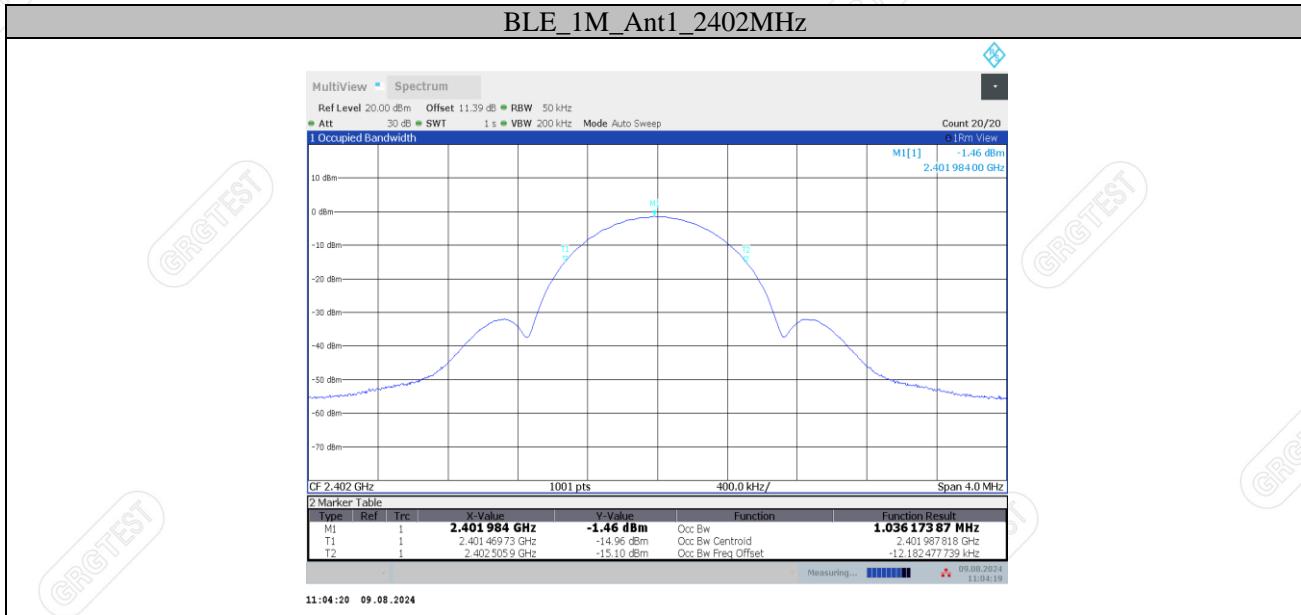
Test Engineer: Qin tingting

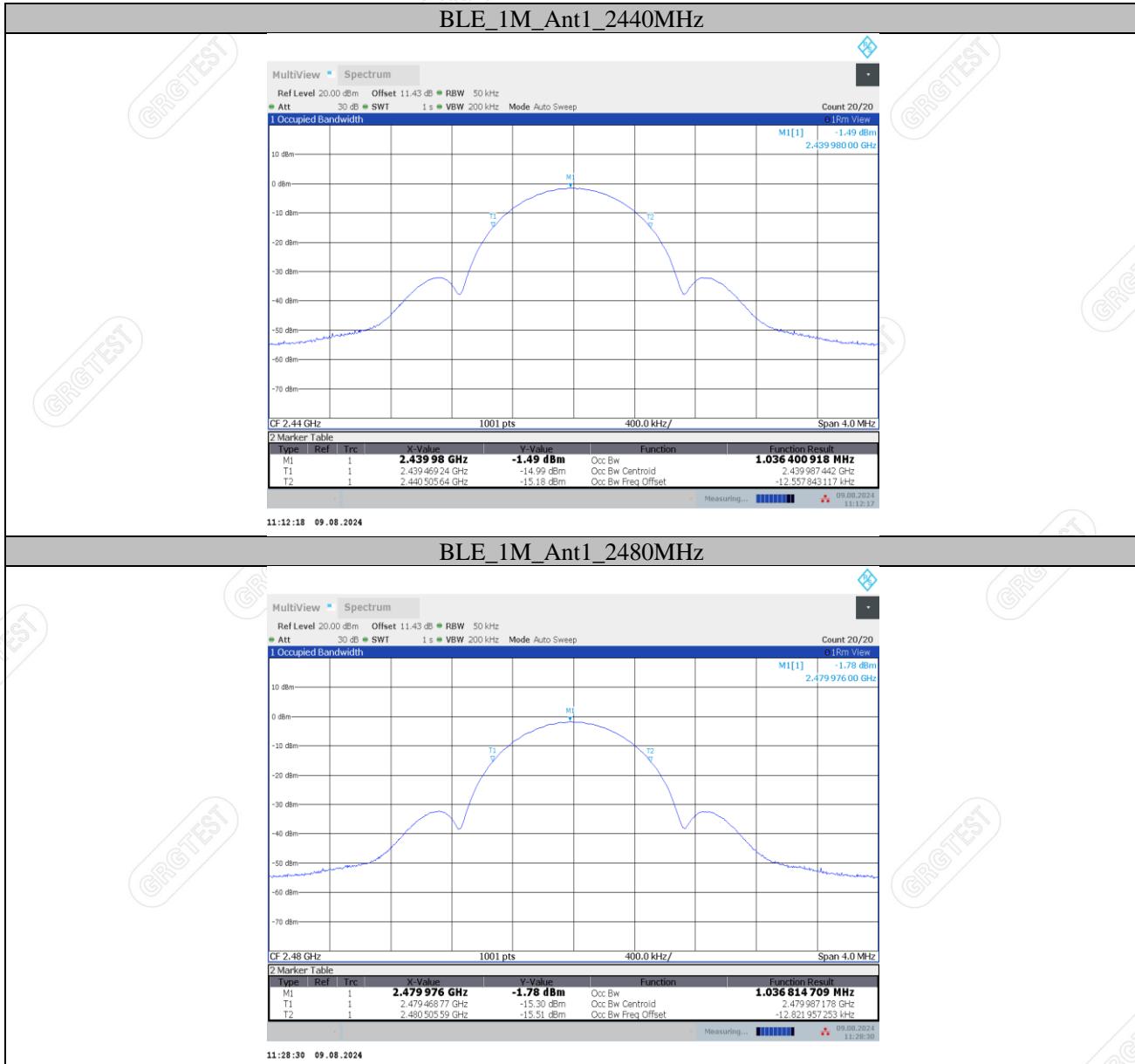
Test Date: 2024-08-09

Test Voltage: DC 3V

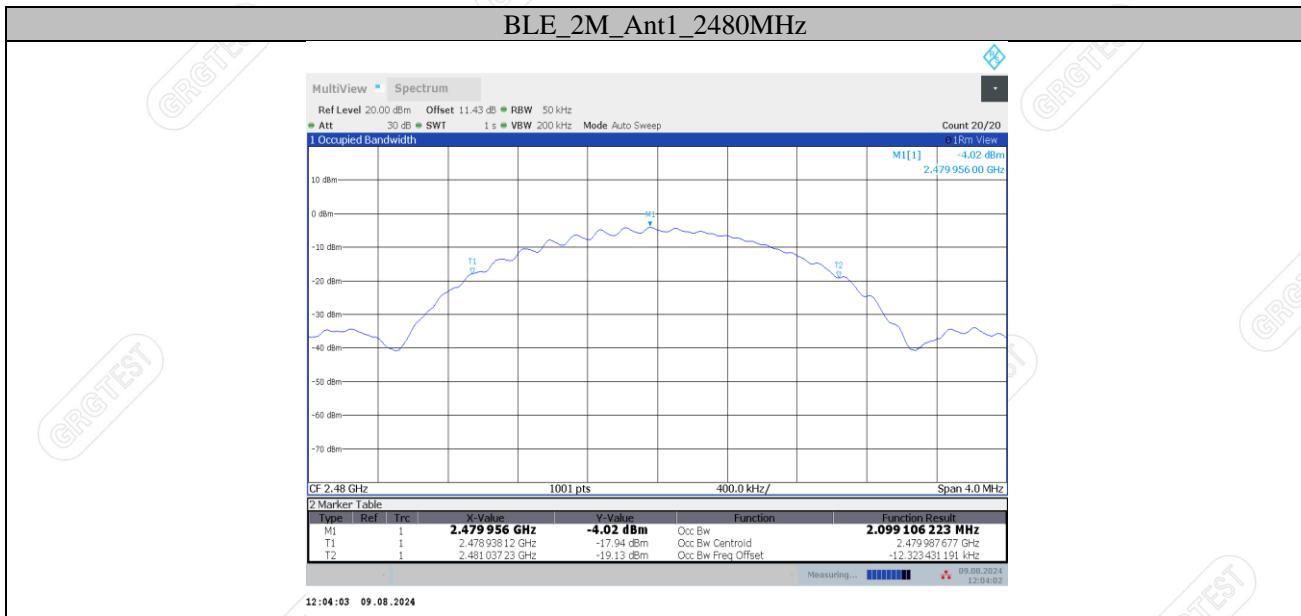
Test Mode	Antenna	Freq[MHz]	OCB[MHz]	F <sub>L</sub> [MHz]	F <sub>H</sub> [MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.036	2401.4697	2402.5059	2400 to 2483.5	PASS
		2440	1.036	2439.4692	2440.5056	2400 to 2483.5	PASS
		2480	1.037	2479.4688	2480.5056	2400 to 2483.5	PASS
BLE_2M	Ant1	2402	2.083	2400.9462	2403.0295	2400 to 2483.5	PASS
		2440	2.093	2438.9411	2441.0339	2400 to 2483.5	PASS
		2480	2.099	2478.9381	2481.0372	2400 to 2483.5	PASS

## Test screenshots









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## 6.4 TRANSMITTER SPURIOUS EMISSIONS

Test Requirement: AS/NZS 4268:2017 Clause 6.4

Test Method: ETSI EN 300 328 V2.2.2/5.4.9.2.2

### 6.4.1 LIMIT

This requirement applies to all types of non-FHSS equipment.

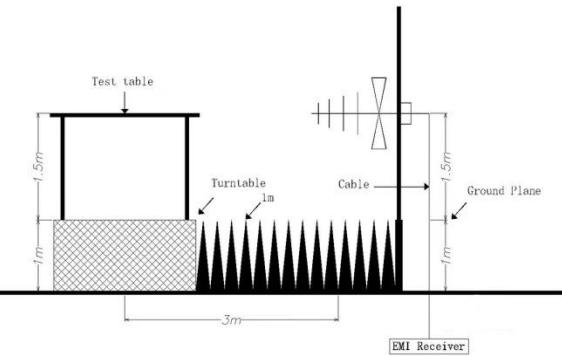
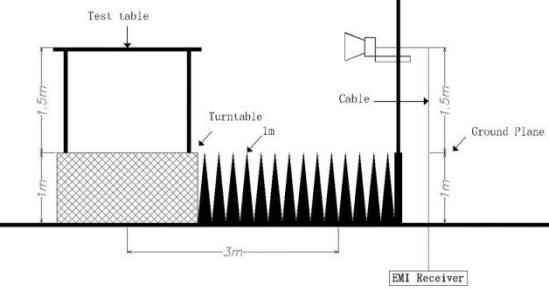
The transmitter unwanted emissions in the spurious domain shall not exceed the values given in table 2. In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz.

Table 2: Transmitter limits for spurious emissions

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

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#### 6.4.2 TEST CONFIGURATION

**30MHz~1000MHz****1000MHz~12750MHz**

#### 6.4.3 TEST PROCEDURES

Test condition: Mode 1

Test channel: Lowest channel, Highest channel

Test procedure: Test procedure is according to Clause 5.4.9.2.1 of ETSI EN 300 328 V2.2.2

Remark: Pre-test all data rate and channel, tested and recorded the worst case data.

#### 6.4.4 DATA SAMPLE

Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
XXX	-49.71	-57.90	-30.00	27.90	-8.19	RMS	Horizontal

Frequency (MHz) = Emission frequency in MHz

Reading (dBm) = Uncorrected Analyzer / Receiver reading

Level (dBm) = Reading (dBm) + Factor (dB)

Limit (dBm) = Limit stated in standard

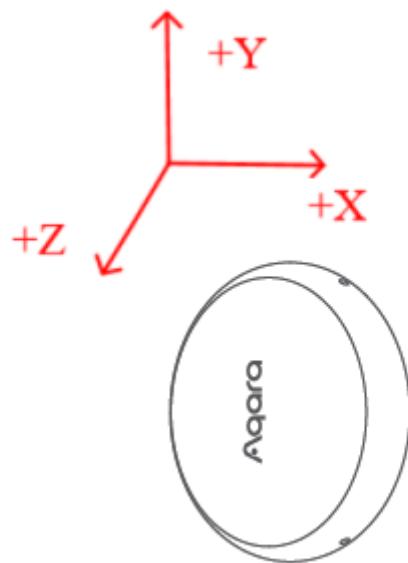
Margin (dB) = Limit(dBm) - Level (dBm)

RMS = Root Mean Square

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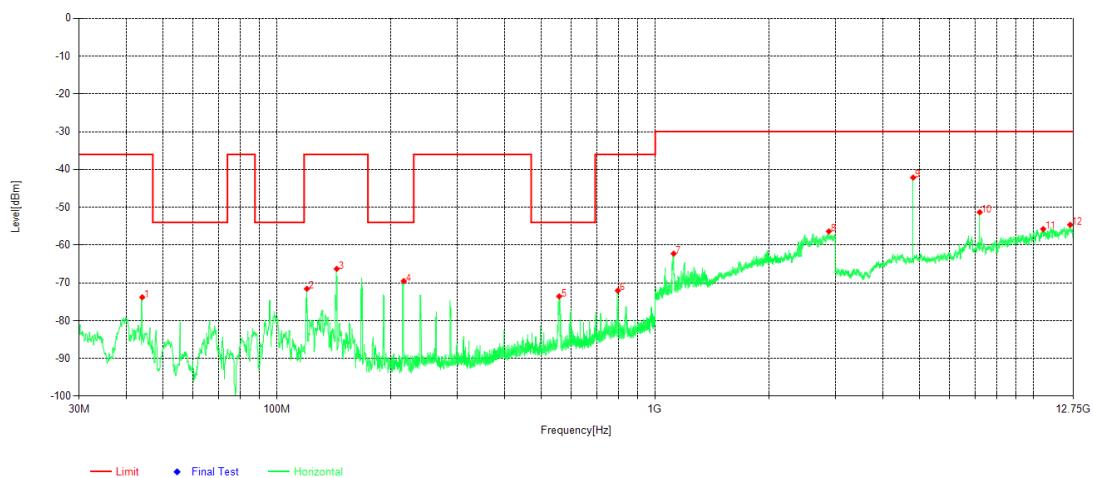
#### 6.4.5 TEST RESULTS

The test are under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the Z position. So the data shown the Z position only.



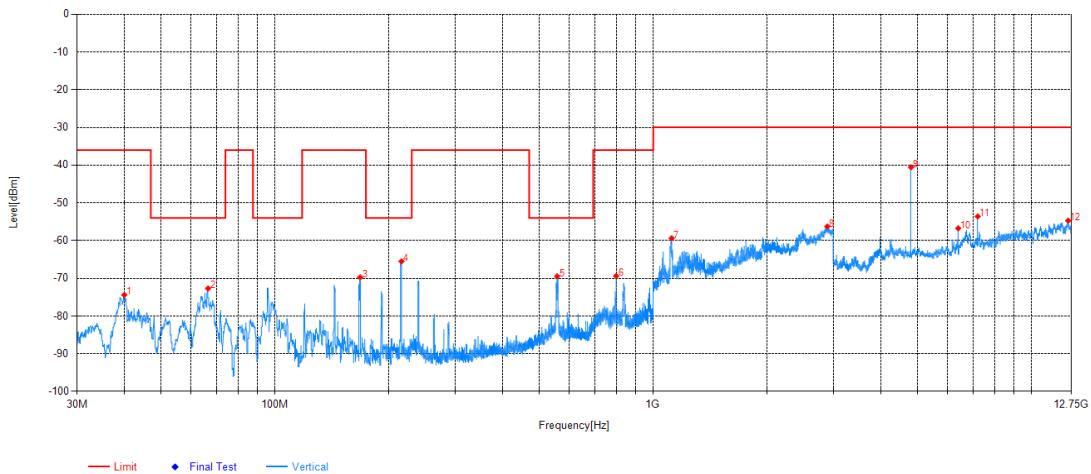
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Model:	AT-R01E	Test Date:	2024-08-14
Mode:	TX BLE_1M_2402MHz	Voltage:	DC 3V
Environment:	23.8°C/67%RH/101.0kPa	Engineer:	Qin tingting



#### Suspected Data List

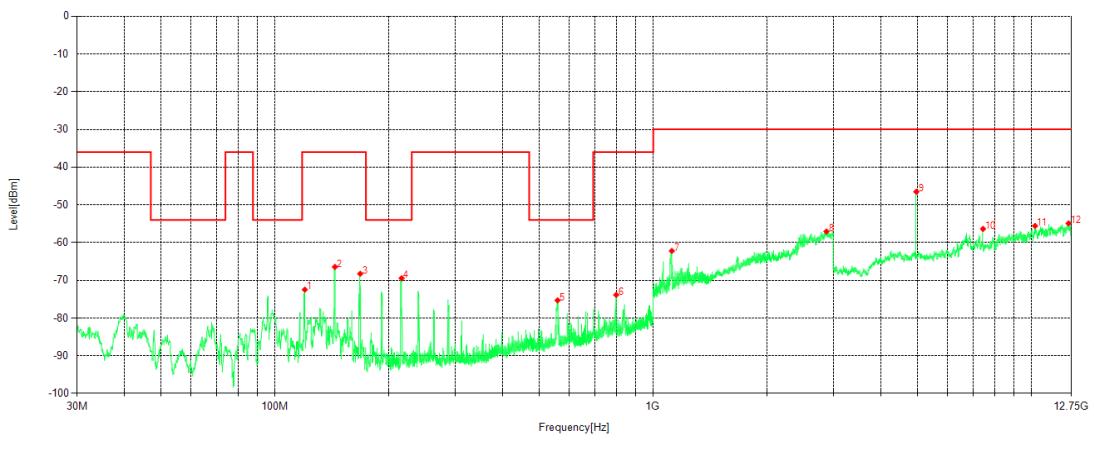
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	44.065	-58.73	-73.82	-36.00	37.82	-15.09	RMS	Horizontal
2	120.016	-53.06	-71.59	-36.00	35.59	-18.53	RMS	Horizontal
3	143.975	-46.96	-66.30	-36.00	30.30	-19.34	RMS	Horizontal
4	216.337	-52.22	-69.53	-54.00	15.53	-17.31	RMS	Horizontal
5	557.195	-64.34	-73.59	-54.00	19.59	-9.25	RMS	Horizontal
6	796.785	-67.04	-72.06	-36.00	36.06	-5.02	RMS	Horizontal
7	1118.4	-60.16	-62.28	-30.00	32.28	-2.12	RMS	Horizontal
8	2876.8	-69.44	-56.40	-30.00	26.40	13.04	RMS	Horizontal
9	4803.75	-40.14	-42.13	-30.00	12.13	-1.99	RMS	Horizontal
10	7206.15	-56.32	-51.34	-30.00	21.34	4.98	RMS	Horizontal
11	10602.07	-67.41	-55.77	-30.00	25.77	11.64	RMS	Horizontal
12	12499.42	-69.29	-54.63	-30.00	24.63	14.66	RMS	Horizontal



#### Suspected Data List

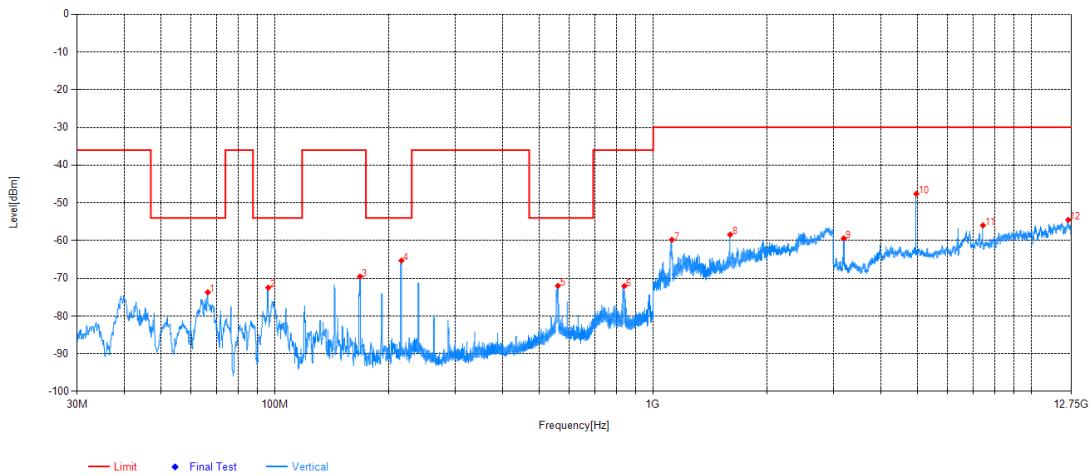
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	39.991	-60.40	-74.41	-36.00	38.41	-14.01	RMS	Vertical
2	66.569	-56.63	-72.71	-54.00	18.71	-16.08	RMS	Vertical
3	1119	-57.74	-59.39	-30.00	29.39	-1.65	RMS	Vertical
4	168.031	-51.86	-69.74	-36.00	33.74	-17.88	RMS	Vertical
5	216.046	-47.98	-65.50	-54.00	11.50	-17.52	RMS	Vertical
6	557.098	-59.93	-69.51	-54.00	15.51	-9.58	RMS	Vertical
7	798.24	-64.23	-69.41	-36.00	33.41	-5.18	RMS	Vertical
8	2883.8	-69.79	-56.29	-30.00	26.29	13.50	RMS	Vertical
9	4803.75	-38.80	-40.58	-30.00	10.58	-1.78	RMS	Vertical
10	6400.8	-58.45	-56.75	-30.00	26.75	1.70	RMS	Vertical
11	7206.15	-58.53	-53.61	-30.00	23.61	4.92	RMS	Vertical
12	12497.47	-69.57	-54.73	-30.00	24.73	14.84	RMS	Vertical

Model:	AT-R01E	Test Date:	2024-08-14
Mode:	TX BLE_1M_2480MHz	Voltage:	DC 3V
Environment:	23.8°C/67%RH/101.0kPa	Engineer:	Qin tingting



#### Suspected Data List

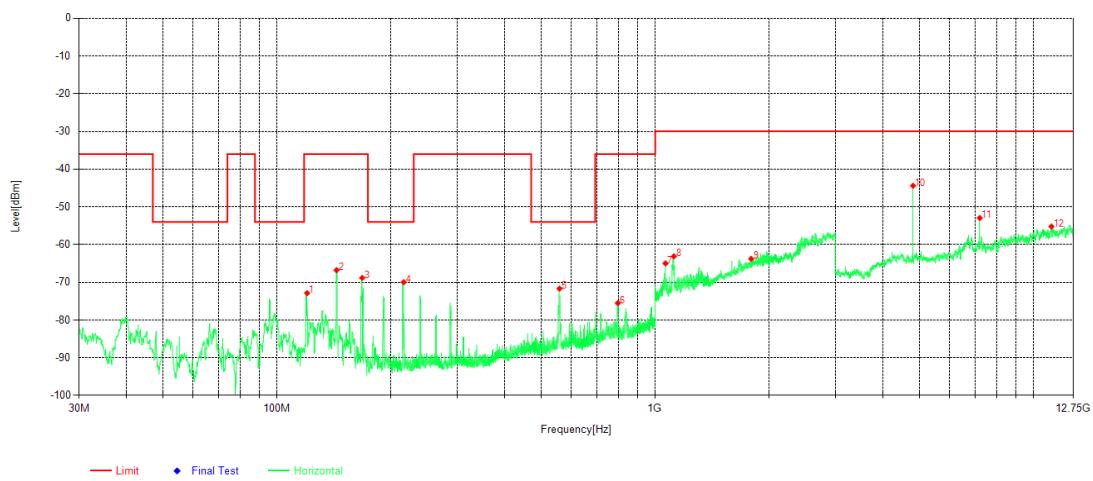
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	120.016	-53.96	-72.49	-36.00	36.49	-18.53	RMS	Horizontal
2	144.169	-47.09	-66.47	-36.00	30.47	-19.38	RMS	Horizontal
3	168.031	-48.77	-68.28	-36.00	32.28	-19.51	RMS	Horizontal
4	216.24	-52.15	-69.47	-54.00	15.47	-17.32	RMS	Horizontal
5	558.456	-66.12	-75.33	-54.00	21.33	-9.21	RMS	Horizontal
6	797.852	-68.69	-73.87	-36.00	37.87	-5.18	RMS	Horizontal
7	1119.8	-60.19	-62.21	-30.00	32.21	-2.02	RMS	Horizontal
8	2869.8	-70.41	-57.06	-30.00	27.06	13.35	RMS	Horizontal
9	4959.75	-45.51	-46.54	-30.00	16.54	-1.03	RMS	Horizontal
10	7439.175	-61.23	-56.39	-30.00	26.39	4.84	RMS	Horizontal
11	10212.07	-66.91	-55.59	-30.00	25.59	11.32	RMS	Horizontal
12	12525.75	-69.15	-54.92	-30.00	24.92	14.23	RMS	Horizontal



#### Suspected Data List

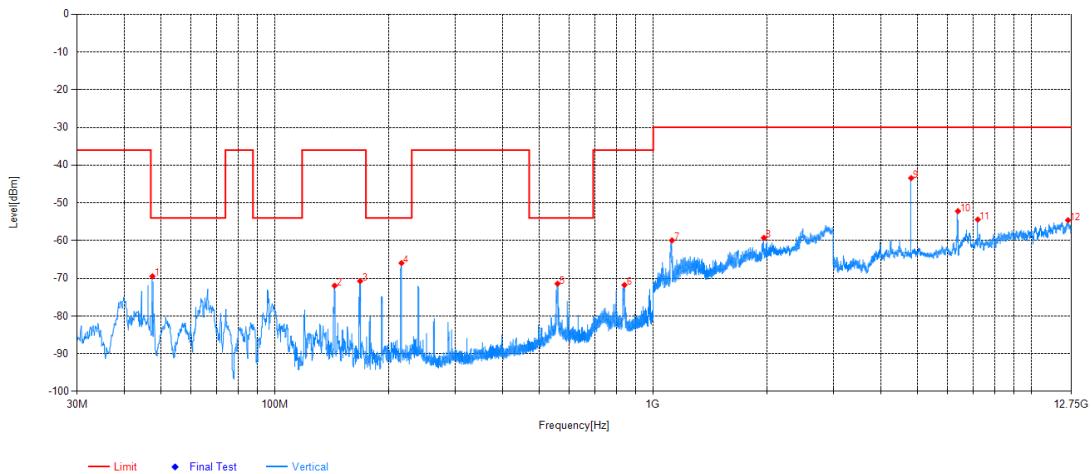
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	66.472	-57.69	-73.72	-54.00	19.72	-16.03	RMS	Vertical
2	96.057	-53.18	-72.49	-54.00	18.49	-19.31	RMS	Vertical
3	167.837	-51.67	-69.55	-36.00	33.55	-17.88	RMS	Vertical
4	216.046	-47.80	-65.32	-54.00	11.32	-17.52	RMS	Vertical
5	559.911	-62.46	-72.01	-54.00	18.01	-9.55	RMS	Vertical
6	838.883	-67.55	-72.07	-36.00	36.07	-4.52	RMS	Vertical
7	1120.2	-58.21	-59.79	-30.00	29.79	-1.58	RMS	Vertical
8	1597.2	-63.03	-58.43	-30.00	28.43	4.60	RMS	Vertical
9	3189.15	-52.63	-59.41	-30.00	29.41	-6.78	RMS	Vertical
10	4959.75	-46.71	-47.61	-30.00	17.61	-0.90	RMS	Vertical
11	7439.175	-60.89	-55.97	-30.00	25.97	4.92	RMS	Vertical
12	12504.3	-69.35	-54.54	-30.00	24.54	14.81	RMS	Vertical

Model:	AT-R01E	Test Date:	2024-08-14
Mode:	TX BLE_2M_2402MHz	Voltage:	DC 3V
Environment:	23.8°C/67%RH/101.0kPa	Engineer:	Qin tingting



#### Suspected Data List

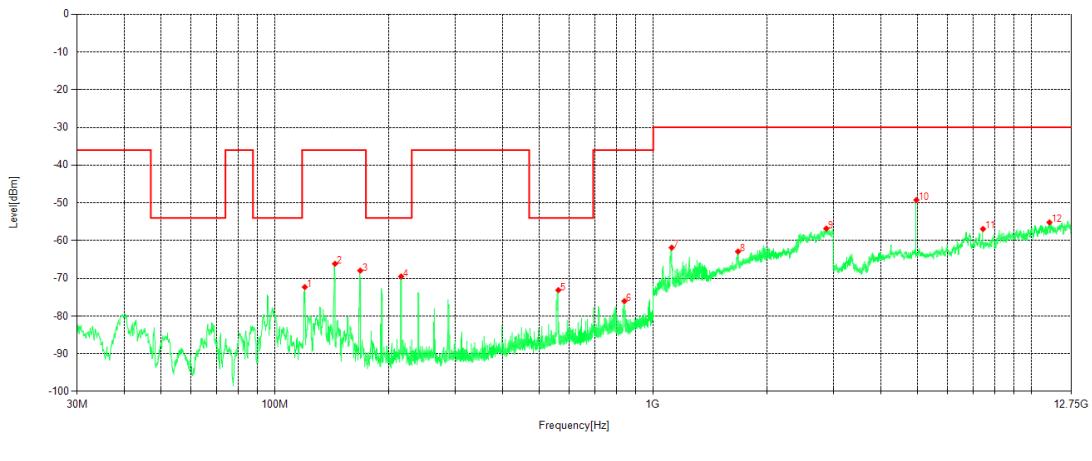
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	120.21	-54.35	-72.89	-36.00	36.89	-18.54	RMS	Horizontal
2	143.781	-47.49	-66.79	-36.00	30.79	-19.30	RMS	Horizontal
3	168.031	-49.35	-68.86	-36.00	32.86	-19.51	RMS	Horizontal
4	216.337	-52.66	-69.97	-54.00	15.97	-17.31	RMS	Horizontal
5	558.553	-62.48	-71.69	-54.00	17.69	-9.21	RMS	Horizontal
6	796.785	-70.51	-75.53	-36.00	39.53	-5.02	RMS	Horizontal
7	1064.4	-62.05	-64.99	-30.00	34.99	-2.94	RMS	Horizontal
8	1120	-61.10	-63.11	-30.00	33.11	-2.01	RMS	Horizontal
9	1793.6	-69.92	-63.79	-30.00	33.79	6.13	RMS	Horizontal
10	4802.775	-42.41	-44.42	-30.00	14.42	-2.01	RMS	Horizontal
11	7207.125	-57.94	-52.97	-30.00	22.97	4.97	RMS	Horizontal
12	11150.02	-68.16	-55.22	-30.00	25.22	12.94	RMS	Horizontal



#### Suspected Data List

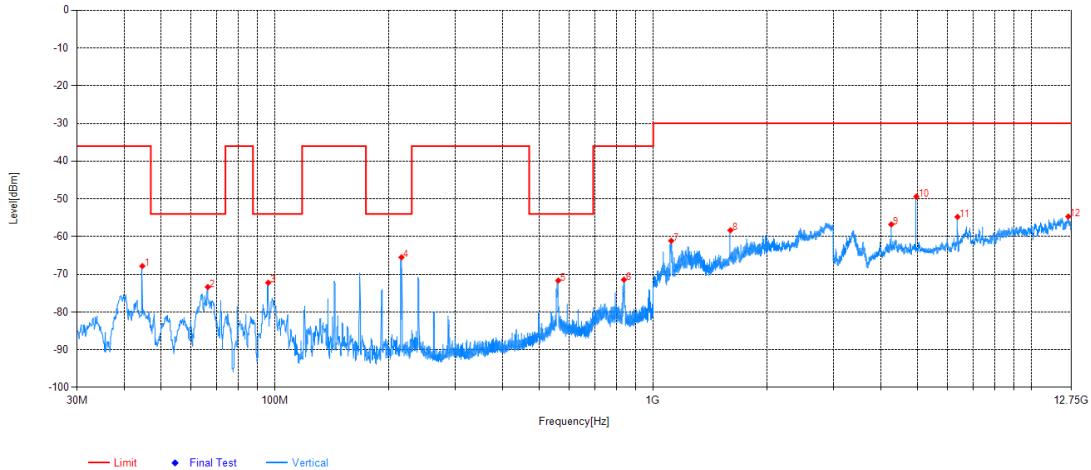
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	47.46	-55.90	-69.47	-54.00	15.47	-13.57	RMS	Vertical
2	143.878	-52.67	-71.98	-36.00	35.98	-19.31	RMS	Vertical
3	167.934	-52.88	-70.76	-36.00	34.76	-17.88	RMS	Vertical
4	216.046	-48.46	-65.98	-54.00	11.98	-17.52	RMS	Vertical
5	558.65	-61.88	-71.44	-54.00	17.44	-9.56	RMS	Vertical
6	839.271	-67.27	-71.78	-36.00	35.78	-4.51	RMS	Vertical
7	1120.8	-58.41	-59.96	-30.00	29.96	-1.55	RMS	Vertical
8	1961	-66.30	-59.29	-30.00	29.29	7.01	RMS	Vertical
9	4803.75	-41.65	-43.43	-30.00	13.43	-1.78	RMS	Vertical
10	6389.1	-53.87	-52.22	-30.00	22.22	1.65	RMS	Vertical
11	7207.125	-59.34	-54.43	-30.00	24.43	4.91	RMS	Vertical
12	12489.67	-69.26	-54.62	-30.00	24.62	14.64	RMS	Vertical

Model:	AT-R01E	Test Date:	2024-08-14
Mode:	TX BLE_2M_2480MHz	Voltage:	DC 3V
Environment:	23.8°C/67%RH/101.0kPa	Engineer:	Qin tingting



#### Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	120.016	-53.81	-72.34	-36.00	36.34	-18.53	RMS	Horizontal
2	144.169	-46.77	-66.15	-36.00	30.15	-19.38	RMS	Horizontal
3	168.031	-48.47	-67.98	-36.00	31.98	-19.51	RMS	Horizontal
4	215.561	-52.19	-69.53	-54.00	15.53	-17.34	RMS	Horizontal
5	561.269	-64.05	-73.15	-54.00	19.15	-9.10	RMS	Horizontal
6	838.98	-71.28	-76.04	-36.00	40.04	-4.76	RMS	Horizontal
7	1118.8	-59.79	-61.88	-30.00	31.88	-2.09	RMS	Horizontal
8	1675.8	-67.57	-62.91	-30.00	32.91	4.66	RMS	Horizontal
9	2866.6	-70.08	-56.82	-30.00	26.82	13.26	RMS	Horizontal
10	4960.725	-48.21	-49.25	-30.00	19.25	-1.04	RMS	Horizontal
11	7441.125	-61.77	-56.93	-30.00	26.93	4.84	RMS	Horizontal
12	11150.02	-68.13	-55.19	-30.00	25.19	12.94	RMS	Horizontal



#### Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	44.647	-54.10	-67.83	-36.00	31.83	-13.73	RMS	Vertical
2	66.472	-57.37	-73.40	-54.00	19.40	-16.03	RMS	Vertical
3	96.057	-52.94	-72.25	-54.00	18.25	-19.31	RMS	Vertical
4	216.046	-47.99	-65.51	-54.00	11.51	-17.52	RMS	Vertical
5	560.978	-62.19	-71.67	-54.00	17.67	-9.48	RMS	Vertical
6	836.846	-66.81	-71.43	-36.00	35.43	-4.62	RMS	Vertical
7	1115.6	-59.24	-61.13	-30.00	31.13	-1.89	RMS	Vertical
8	1599.4	-63.09	-58.35	-30.00	28.35	4.74	RMS	Vertical
9	4257.75	-54.68	-56.78	-30.00	26.78	-2.10	RMS	Vertical
10	4958.775	-48.52	-49.41	-30.00	19.41	-0.89	RMS	Vertical
11	6373.5	-56.39	-54.80	-30.00	24.80	1.59	RMS	Vertical
12	12506.25	-69.46	-54.69	-30.00	24.69	14.77	RMS	Vertical

## 6.5 RECEIVER SPURIOUS EMISSIONS

Test Requirement: AS/NZS 4268:2017 Clause 7.2

Test Method: ETSI EN 300 328 V2.2.2/5.4.10.2.2

### 6.5.1. LIMIT

The spurious emissions of the receiver shall not exceed the values given in table 3.

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted).

For emissions radiated by the cabinet or for emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p for emissions up to 1 GHz and e.i.r.p for emissions above 1 GHz.

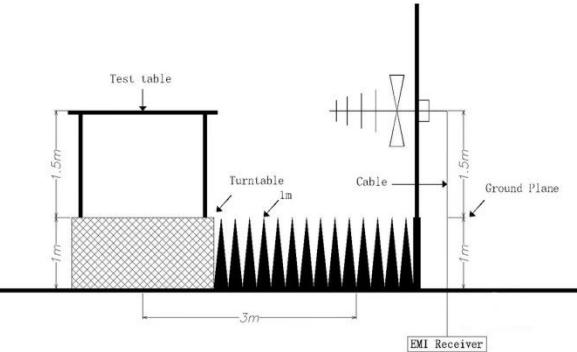
This device uses Radiated measurement.

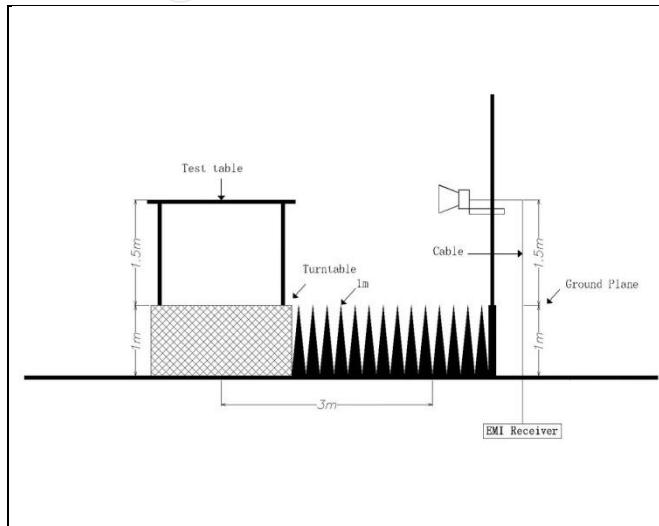
Table 3: Spurious emission limits for receivers

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

### 6.5.2. TEST CONFIGURATION

30MHz-1000MHz



**1000MHz-12750MHz****6.5.3. TEST PROCEDURES**

Test channel: Lowest channel, Highest channel

Test condition: Mode 2

Test procedure: Test procedure is according to Clause 5.4.10.2.2 of ETSI EN 300 328 V2.2.2

Remark: /

**6.5.4. DATA SAMPLE**

Frequency [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
XXX	-58.02	-73.33	-57.00	16.33	-15.31	RMS	Horizontal

Frequency (MHz) = Emission frequency in MHz

Reading (dBm) = Uncorrected Analyzer / Receiver reading

Level (dBm) = Reading (dBm) + Factor (dB)

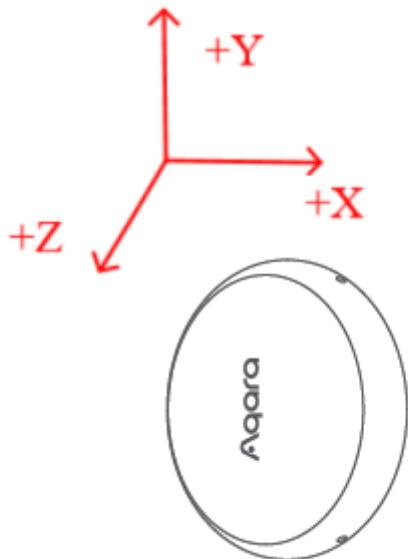
Limit (dBm) = Limit stated in standard

Margin (dB) = Limit(dBm) - Level (dBm)

RMS = Root Mean Square

### 6.5.5. TEST RESULTS

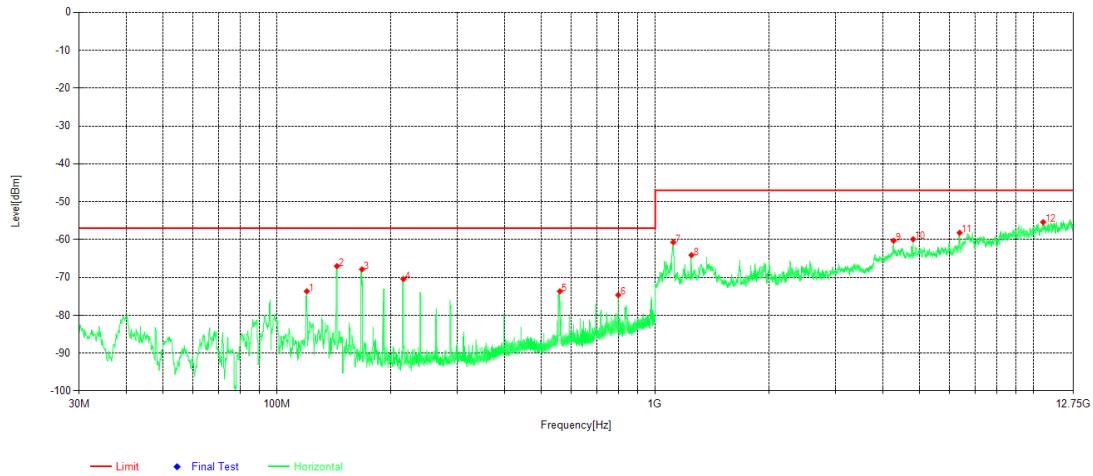
The test are under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the Z position. So the data shown the Z position only.



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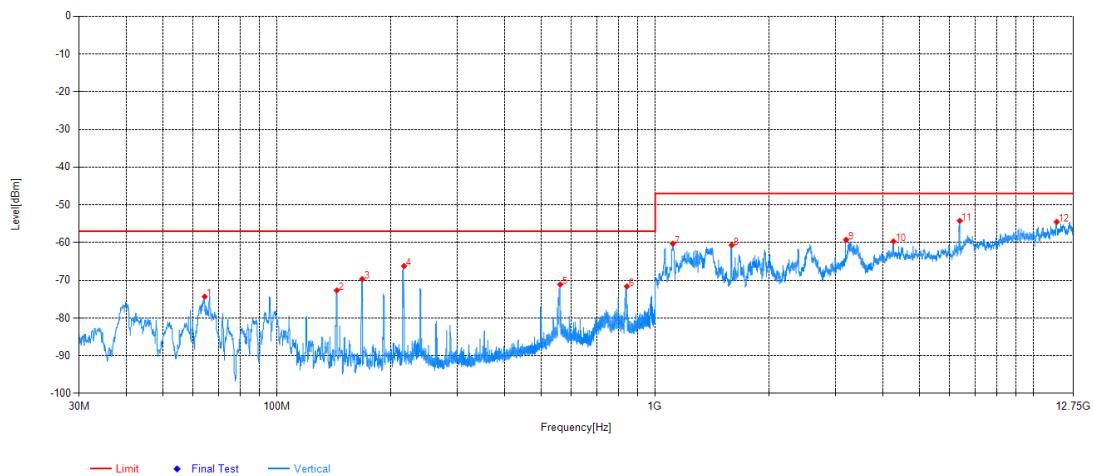
Note: Pre-scan all test modes and only the worst case BLE\_1M test results in the report.

Model:	AT-R01E	Test Date:	2024-08-14
Mode:	RX BLE_1M_2402MHz	Voltage:	DC 3V
Environment:	23.8°C/67%RH/101.0kPa	Engineer:	Qin tingting



#### Suspected Data List

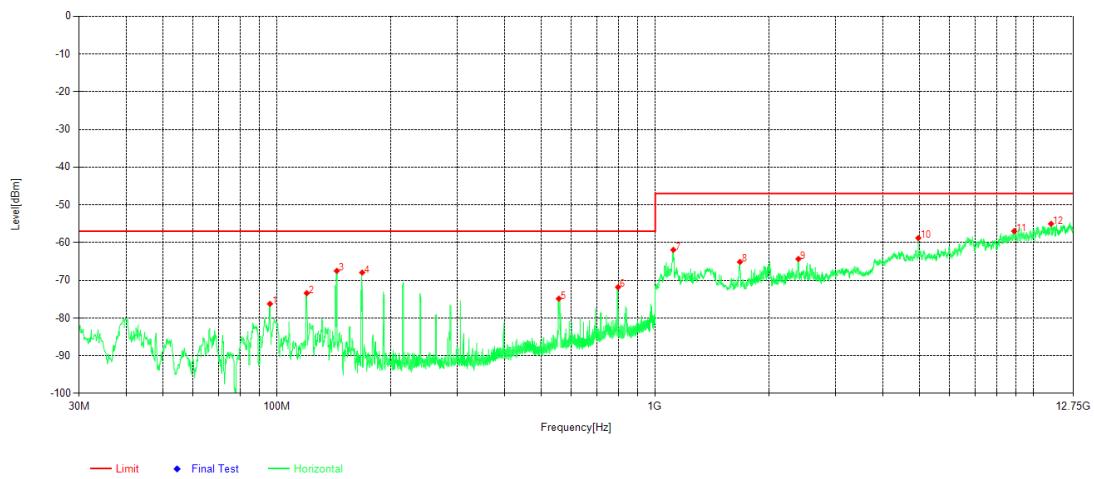
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	120.016	-55.15	-73.68	-57.00	16.68	-18.53	RMS	Horizontal
2	144.072	-47.66	-67.02	-57.00	10.02	-19.36	RMS	Horizontal
3	167.837	-48.35	-67.87	-57.00	10.87	-19.52	RMS	Horizontal
4	215.949	-53.09	-70.42	-57.00	13.42	-17.33	RMS	Horizontal
5	559.717	-64.49	-73.67	-57.00	16.67	-9.18	RMS	Horizontal
6	798.822	-69.33	-74.65	-57.00	17.65	-5.32	RMS	Horizontal
7	1116.325	-46.50	-60.73	-47.00	13.73	-14.23	RMS	Horizontal
8	1246.75	-51.04	-64.11	-47.00	17.11	-13.07	RMS	Horizontal
9	4266.5	-58.32	-60.33	-47.00	13.33	-2.01	RMS	Horizontal
10	4804.65	-57.96	-59.93	-47.00	12.93	-1.97	RMS	Horizontal
11	6379.15	-59.88	-58.23	-47.00	11.23	1.65	RMS	Horizontal
12	10600.92	-67.11	-55.40	-47.00	8.40	11.71	RMS	Horizontal



#### Suspected Data List

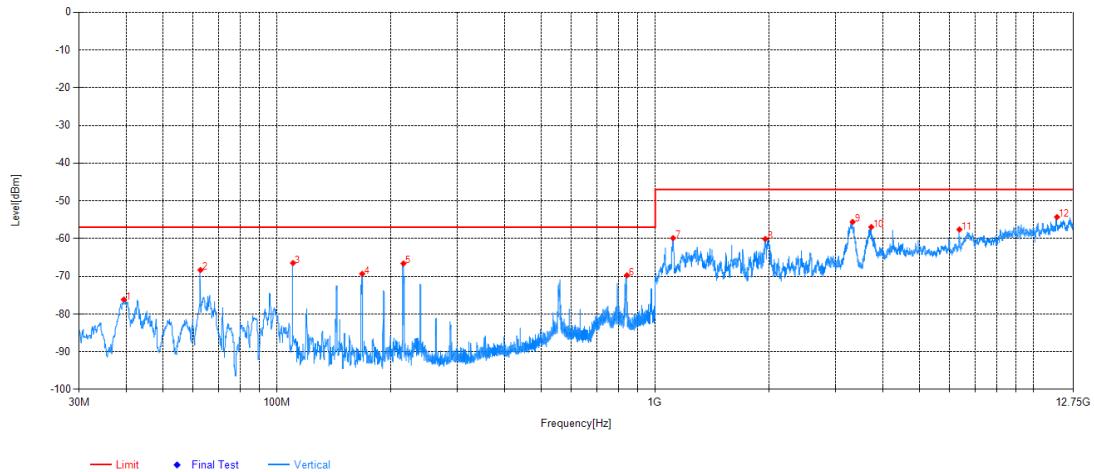
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	64.435	-59.43	-74.35	-57.00	17.35	-14.92	RMS	Vertical
2	143.975	-53.39	-72.69	-57.00	15.69	-19.30	RMS	Vertical
3	168.031	-51.80	-69.68	-57.00	12.68	-17.88	RMS	Vertical
4	216.822	-48.72	-66.23	-57.00	9.23	-17.51	RMS	Vertical
5	560.978	-61.64	-71.12	-57.00	14.12	-9.48	RMS	Vertical
6	841.599	-67.24	-71.62	-57.00	14.62	-4.38	RMS	Vertical
7	1112.8	-46.44	-60.29	-47.00	13.29	-13.85	RMS	Vertical
8	1592.2	-47.74	-60.69	-47.00	13.69	-12.95	RMS	Vertical
9	3194.9	-52.26	-59.26	-47.00	12.26	-7.00	RMS	Vertical
10	4264.15	-57.78	-59.70	-47.00	12.70	-1.92	RMS	Vertical
11	6380.325	-55.83	-54.23	-47.00	7.23	1.60	RMS	Vertical
12	11512.72	-68.31	-54.53	-47.00	7.53	13.78	RMS	Vertical

Model:	AT-R01E	Test Date:	2024-08-14
Mode:	RX BLE_1M_2480MHz	Voltage:	DC 3V
Environment:	23.8°C/67%RH/101.0kPa	Engineer:	Qin tingting



#### Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	95.863	-59.35	-76.24	-57.00	19.24	-16.89	RMS	Horizontal
2	119.919	-54.90	-73.42	-57.00	16.42	-18.52	RMS	Horizontal
3	143.975	-48.17	-67.51	-57.00	10.51	-19.34	RMS	Horizontal
4	168.031	-48.46	-67.97	-57.00	10.97	-19.51	RMS	Horizontal
5	556.419	-65.61	-74.88	-57.00	17.88	-9.27	RMS	Horizontal
6	797.755	-66.68	-71.84	-57.00	14.84	-5.16	RMS	Horizontal
7	1116.325	-47.69	-61.92	-47.00	14.92	-14.23	RMS	Horizontal
8	1674.45	-52.18	-65.14	-47.00	18.14	-12.96	RMS	Horizontal
9	2390.025	-53.34	-64.35	-47.00	17.35	-11.01	RMS	Horizontal
10	4960.925	-57.83	-58.80	-47.00	11.80	-0.97	RMS	Horizontal
11	8883.075	-65.46	-56.98	-47.00	9.98	8.48	RMS	Horizontal
12	11123.8	-67.77	-55.04	-47.00	8.04	12.73	RMS	Horizontal



#### Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	39.409	-61.95	-76.18	-57.00	19.18	-14.23	RMS	Vertical
2	62.786	-54.31	-68.34	-57.00	11.34	-14.03	RMS	Vertical
3	110.316	-46.50	-66.49	-57.00	9.49	-19.99	RMS	Vertical
4	168.031	-51.47	-69.35	-57.00	12.35	-17.88	RMS	Vertical
5	216.046	-49.09	-66.61	-57.00	9.61	-17.52	RMS	Vertical
6	841.405	-65.37	-69.76	-57.00	12.76	-4.39	RMS	Vertical
7	1115.15	-46.04	-59.89	-47.00	12.89	-13.85	RMS	Vertical
8	1954.1	-48.38	-60.11	-47.00	13.11	-11.73	RMS	Vertical
9	3324.15	-48.93	-55.61	-47.00	8.61	-6.68	RMS	Vertical
10	3723.65	-50.48	-56.94	-47.00	9.94	-6.46	RMS	Vertical
11	6369.75	-59.23	-57.60	-47.00	10.60	1.63	RMS	Vertical
12	11533.87	-68.20	-54.31	-47.00	7.31	13.89	RMS	Vertical

## **APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM**

Please refer to the attached document E20240725192701-CE AUS-Test Photo.

## **APPENDIX B. PHOTOGRAPHS OF EUT**

Please refer to the attached document E20240725192701-EUT photo.

----- End of Report -----